GCSE Mathematics (1MA1) – Aiming for 7 Paper 2H

Student-friendly mark scheme 2.0

Please note that this mark scheme is not the one used by examiners for making scripts. It is intended more as a guide to good practice, indicating where marks are given for correct answers. As such, it doesn't show follow-through marks (marks that are awarded despite errors being made) or special cases.

It should also be noted that for many questions, there may be alternative methods of finding correct solutions that are not shown here – they will be covered in the formal mark scheme.

NOTES ON MARKING PRINCIPLES

Guidance on the use of codes within this mark scheme

M1 – method mark. This mark is generally given for an appropriate method in the context of the question. This mark is given for showing your working and may be awarded even if working is incorrect.

P1 – process mark. This mark is generally given for setting up an appropriate process to find a solution in the context of the question.

A1 – accuracy mark. This mark is generally given for a correct answer following correct working.

B1 – working mark. This mark is usually given when working and the answer cannot easily be separated.

C1 – communication mark. This mark is given for explaining your answer or giving a conclusion in context supported by your working.

Some questions require all working to be shown; in such questions, no marks will be given for an answer with no working (even if it is a correct answer).

Question 1 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$7000 \times 1.03 = 7210$	M1	This mark is given for a method to find the value of the investment after one year
	7210×1.015	M1	This mark is given for a method to find the value of the investment after two years
	7318.15	A1	This mark is given for the correct answer only

Question 2 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$187.5 = \dfrac{180}{A}, \quad A = \dfrac{180}{187.5} = 0.96$	P1	This mark is given for a process to find the area of the floor
	$0.96 \div 1.2$	P1	This mark is given for a process to fins the width of the floor
	0.8	A1	This mark is given for the correct answer only

Question 3 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$679 \times 0.96 = 651.84$	M1	This mark is given for a method to find the decrease in value after one year (given also if $679 \times (0.96)^3$ seen)
	$651.84 \times 0.96 \times 0.96$ **or** $679 \times (0.96)^3$	M1	This mark is given for a method to find the decrease in value after three years
	600.74	A1	This mark is given for the correct answer only (accept 600.73)

Question 4 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$135 - 120 = 15$	M1	This mark is given for a method to find the absolute profit in £
	$\dfrac{15}{120} \times 100$	M1	This mark is given for a method to find the percentage profit
	1.25	A1	This mark is given for the correct answer only

Question 5 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$14.5 \times \cos 53°$	M1	This mark is given for a method to find the length x
	8.73	A1	This mark is given for a correct answer to three significant figures

Question 6 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$18 \div 4.5 = 4$ **or** $8 \times 4.5 = 36$ (18 litres = 4 gallons **or** 8 gallons = 36 litres)	P1	This mark is given for a process to convert between litres and gallons
	$40.8 \div 0.85 = 48$ **or** $27 \times 0.85 = 22.95$ (£40.80 = €48 **or** €27 = £22.95)	P1	This mark is given for a process to convert between euros and pounds
	Sam pays £22.95 for 4 gallons Leo pays £20.40 for 4 gallons **or** Sam pays €27 for 18 litres Leo pays €24 for 18 litres	P1	This mark is given for a process to make a comparison between petrol prices
	For example: Sam is wrong, petrol is cheaper in Wales	C1	This mark is given for the valid conclusion supported by correct working

Question 7 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\dfrac{180}{N} = \dfrac{45}{305}$	P1	This mark is given for $\dfrac{45}{305}$ seen
	$N = \dfrac{180 \times 305}{45}$	P1	This mark is given for a process to find N, the number of fish in the lake
	1220	A1	This mark is given for the correct answer only

Question 8 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$5y = 5(2x + 3) = 10x + 15$ $5y = 10x - 4$ **or** $y - 2x + \dfrac{4}{5} = 0$ $y = 2x - \dfrac{2}{5}$	M1	This mark is given for a method to manipulate two equations to make a comparison
	Gradient = 2 for both lines So lines are parallel	A1	This mark is given for equations which show gradients of the two lines are the same

Question 9 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$700 \times 2000 = 1\,400\,000$	P1	This mark is given for a process to find the area available at Festival B
	Festival A: $80\,000 \div 425 = 188.23\ldots$ Festival B: $1\,400\,000 \div = 6750 = 207.40\ldots$	P1	This mark is given a method to find the area available per person at (at least) one Festival
	$207.40\ldots - 188.23\ldots = 19.17\ldots$	P1	This mark is given for finding the difference in area per person
	19 (to the nearest whole number)	A1	This mark is given for the correct answer only
(b)	For example: 300 cm^2 is 0.3 m $\times$ 0.3 m $= 0.09$ m^2 3 m^2 is 300 cm $\times$ 300 cm $= 90\,000$ cm^2	C1	This mark is given for a valid statement relating scale factor to area

Question 10 (Total 3 marks)

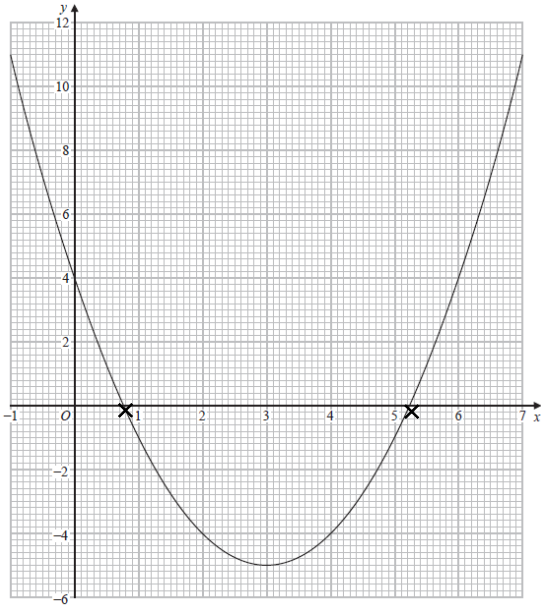| Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$(x^3)^5 = x^{(3 \times 5)} = x^{15}$	B1	This mark is given for the correct answer only
(b)	$4x + 12 + 28 - 14x$	M1	This mark is given for a method to expand at least one bracket
	$40 - 10x$	A1	This mark is given for the correct answer only
(c)	$3(5x^3 + x^2y)$ **or** $3x(5x^2 + xy)$ **or** $x^2(15x + 3y)$	M1	This mark is given for a method to eliminate at least one factor
	$3x^2(5x + y)$	A1	This mark is given for the correct answer only

Question 11 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	(2, 1)	B1	This mark is given for the correct answer only
(b)	For example: As the amount of rainfall decreases, the number of hours of sunshine increases	C1	This mark is given for a valid description of the relationship
(c)		M1	This mark is given for a suitable line of best fit drawn
	3.5	A1	This mark is given for an answer in the range 3 to 4

Question 12 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$89.5 \leq$ length < 90.5	B1	This mark is given for 89.5 shown in the correct position
		B1	This mark is given for 90.5 shown in the correct position

Question 13 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	4	B1	This mark is given for the correct answer only
(b)	(3, –5)	B1	This mark is given for the correct answer only
(c)		M1	This mark is given for a method to mark the intercepts with the *x*-axis on the graph
	5.2, 0.8	A1	This mark is given for correct answers in the ranges 5.1 to 5.3 and 0.7 to 0.9

Question 14 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$6 \times 14\frac{1}{2} = 87$ **or** $13 \times 7 = 91$	M1	This mark is given for a method to measure the job in worker days
	$87 \div 7$ **or** $87 \div 13$	P1	This mark is given for a process to work out number of workers needed to finish the job in 7 days **or** the number of days needed to finish the job with 13 workers
	12.428 (workers needed for 7 days) **or** 6.692 (days needed with 13 workers)	C1	This mark is given for a correct answer only

Question 15 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	For example: $x = 1.06222…$ $10x = 10.6222….$ $100x = 106.222…$ $1000x = 1062.22….$	M1	This mark is given for a method to start to show the decimal as a fraction
	$1000x - 100x = 956$ $900x = 956$ $x = \dfrac{956}{900}$	M1	This mark is given for a method to find x as a fraction
	$x = \dfrac{239}{225} = 1\dfrac{14}{225}$	A1	This mark is given for a fully correct proof

Question 16 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	For example, any of these seen: 6.07(5732…) 2.68(328…) 0.372(6779962…) 1.98(3851871…)	M1	This mark is given for a method to find a partial evaluation
	0.739	A1	This mark is given for an answer in the range 0.739 to 0.745

Question 17 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$y = \dfrac{3}{6}x + \dfrac{7}{6}$ so $y = \dfrac{1}{2}x + \dfrac{7}{6}$	M1	This mark is given for writing $6y = 3x + 7$ in terms of y
	For example: Yes, both lines have a gradient of $\dfrac{1}{2}$	A1	This mark is given for a valid answer supported by a correct explanation

Question 18 (Total 4 marks)

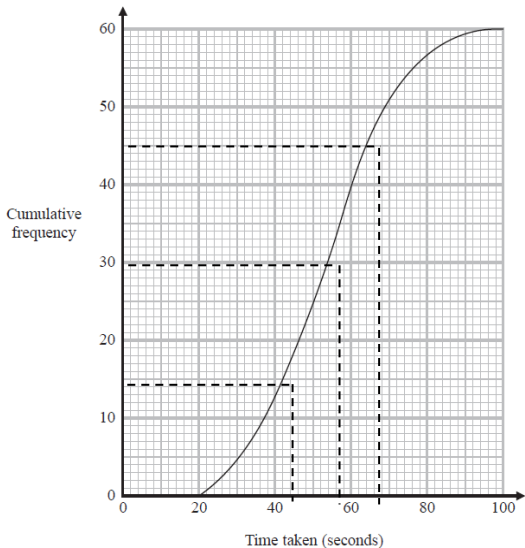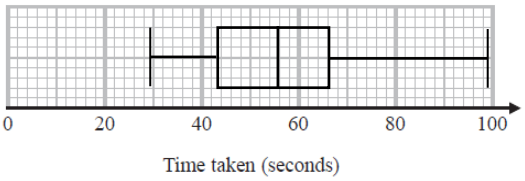| Part	Working an or answer examiner might expect to see	Mark	Notes
(a)	$6n + 1$	B2	These marks are given for a fully correct answer (B1 is given for $6n + c$, where c is an integer $\neq 1$ or is missing)
(b)	$8 - 6n = -58$ $-6n = -66$ $-n = -11$	M1	This mark is given for a method to find whether or not n is an integer
	Yes, it is the 11th term	A1	This mark is given for valid explanation supported by correct working

Question 19 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	ABCO: $11 \times 7 = 77$ *DEFO*: $9 \times 7 = 63$ *CDO*: $\frac{1}{2} \times 11 \times 9 = 49.5$ *AFO*: $\frac{1}{4} \times \pi \times 7^2 = 38.4845\ldots$	P1	This mark is given for a process to find at least three of the four areas
	$77 + 63 + 49.5 + 38.4845\ldots = 227.9845\ldots$	P1	This mark is given for a process to find the total area of the garden
	$227.9845\ldots \div 14 = 16.2846\ldots$	P1	This mark is given for a process to find out the number of bags of grass seed needed
	17×10.95	M1	This mark is given for a process to find out the cost of the bags of grass seed needed (the number of bags must be an integer)
	186.15	A1	This mark is given for the correct answer only

Question 20 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$\dfrac{20}{12}$ or $\dfrac{12}{42}$ or $\dfrac{12}{20}$ seen	P1	This mark is given for a start to a process to find an estimate for the number of rabbits in the park
	For example: $\dfrac{20}{N} = \dfrac{12}{42}$ so $N = \dfrac{20 \times 42}{12}$	P1	This mark is given for a process to find an estimate for the number of rabbits, N, in the park
	70	A1	This mark is given for the correct answer only
(b)	For example: The sample size cannot be greater than the population size	C1	This mark is given for a valid explanation

Question 21 (Total 3 marks)

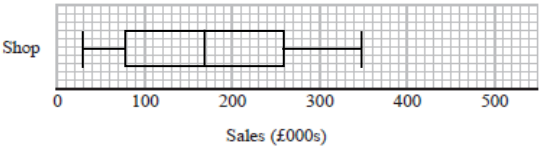| Part	Working or answer an examiner might expect to see	Mark	Notes
		B1	This mark is given for correctly identifying at least one of the lower quartile (42), median (54) or upper quartile (64) from the cumulative frequency diagram
		B2	These marks are given for a fully correct box plot (B1 is given for a box with at least three correctly plotted values from 24, 42, 54, 64 and 96)

Question 22 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Area = $\frac{1}{2}$ × 11.2 × 4.3 × sin 118°	P1	This mark is given for a method to use the formula $A = \frac{1}{2}ab \sin C$
	21.3	A1	This mark is given for a correct answer only (to 3 significant figures)

Question 23 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$11^2 + 9.4^2 - (2 \times 11 \times 9.4 \cos 27)$	M1	This mark is given for a method to use the cosine rule to find the length QR
	$QR = \sqrt{209.36 - 206.8 \times \cos 27}$ $QR = \sqrt{25.09}$ $QR = 5.009$	M1	This mark is given for a method to simplify the numerator
	$\frac{QS}{\sin 88} = \frac{QR}{\sin 41}$ so $QS = \frac{QR \times \sin 88}{\sin 41}$	M1	This mark is given for a method to use the sine rule to find the length QS
	7.63	A1	This mark is given for a correct answer in the range 7.61 to 7.632

Question 24 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	For example: The IQR is half of the data	C1	This mark is given for a correct explanation
(b)		B2	These marks are given for a correctly drawn boxplot (B1 is given for a box and at least three values plotted correctly)
(c)	For example: The shop takes less money from sales in general since the median is lower	C1	This mark is given for a correct comparison of the medians
	For example: The IQR of sales for the online store is greater than the IQR for the sales of the shop	C1	This mark is given for a correct comparison of the measure of spread

Aiming for 7 Paper 2H (Set 3)					Edexcel averages: mean scores of students who achieved grade								
Qn	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3	U
1	Growth and decay, compound interest	1.93	3	64	1.93	2.91	2.84	2.80	2.62	2.28	1.68	0.87	0.00
2	Use compound units	2.33	3	78	2.33	2.97	2.92	2.79	2.44	1.72	0.86	0.34	0.17
3	Growth and decay, compound interest	2.58	3	86	2.58	2.94	2.87	2.78	2.64	2.35	1.82	1.05	0.45
4	Percentages and problems involving percentage change	2.09	3	70	2.09	2.85	2.94	2.75	2.68	2.36	1.83	1.30	0.00
5	Pythagoras's Theorem and Trigonometry	1.00	2	50	1.00	1.97	1.79	1.82	1.61	1.15	0.67	0.20	0.00
6	Units of mass, length, time, money and other measures (including standard compound measures)	3.49	4	87	3.49	3.87	3.76	3.62	3.46	3.28	2.99	2.42	1.67
7	Sampling	2.24	3	75	2.24	2.96	2.89	2.71	2.29	1.59	0.85	0.32	0.07
8	Gradients and intercepts of linear functions	1.37	2	69	1.37	1.98	1.94	1.80	1.39	0.73	0.26	0.06	0.02
9	Change between standard units and compound units	4.16	5	83	4.16	4.89	4.70	4.45	4.14	3.75	3.10	1.88	0.84
10	Algebraic manipulation	4.05	5	81	4.05	4.88	4.72	4.43	4.03	3.48	2.73	1.90	1.09
11	Correlation and causation	2.70	4	68	2.70	3.73	3.59	3.51	3.25	3.02	2.54	1.81	1.05
12	Rounding; Inequality notation to specify error interval	1.54	2	77	1.54	1.93	1.83	1.71	1.54	1.30	0.95	0.47	0.13
13	Roots, intercepts, turning points of quadratic functions	2.17	4	54	2.17	3.88	3.86	3.41	2.98	2.46	1.69	0.99	0.01
14	Solve problems involving direct and inverse proportion	2.10	3	70	2.10	2.93	2.79	2.54	2.12	1.45	0.70	0.18	0.06
15	Recurring decimals and their corresponding fractions	1.24	3	41	1.24	2.79	2.61	2.48	1.99	1.34	0.71	0.28	0.00
16	Roots and powers	1.49	2	75	1.49	1.88	1.77	1.65	1.50	1.25	0.89	0.45	0.13
17	Graphs and equations of lines	0.68	2	34	0.68	1.88	1.84	1.65	1.26	0.72	0.19	0.01	0.02
18	Linear and non-linear sequences of diagrams and numbers	2.38	4	60	2.38	3.85	3.62	3.29	2.97	2.60	2.06	1.57	0.79
19	Areas of composite shapes	2.32	5	46	2.32	4.67	4.51	3.96	3.64	3.00	1.42	0.48	0.00
20	Sampling	1.74	4	44	1.74	3.61	3.20	3.13	2.65	1.90	1.05	0.67	0.04
21	Measures of spread (range, including consideration of outliers, quartiles and inter-quartile range)	0.98	3	33	0.98	2.79	2.39	2.31	1.67	1.04	0.39	0.13	0.01
22	Area of a triangle using the angle formula	0.82	2	41	0.82	1.82	1.91	1.51	1.36	0.89	0.47	0.15	0.03
23	Sine and cosine rule	2.05	4	51	2.05	3.86	3.56	2.91	1.68	0.59	0.13	0.02	0.02
24	Box plots	3.32	5	66	3.32	4.30	3.90	3.57	3.21	2.81	2.37	1.79	1.11
		50.77	80	63	50.77	76.14	72.75	67.58	59.12	47.06	32.35	19.34	7.71

Suggested grade boundaries

Grade	9	8	7	6	5	4	3
Mark	74	70	63	53	40	26	14